Study Guide

Translation

* Translation is the synthesis of proteins.
* Translation occurs in the cytoplasm where the ribosomes are located.
* Amino acids should be joined to produce a polypeptide
* Ribosomes use the sequence of codons in mRNA to assemble amino acids into polypeptide chains
  + The decoding of an mRNA message into a protein is a process known as translation
  + Translation begins when a ribosome attaches to an mRNA molecules in the cytoplasm. One at a time the ribosome attaches the amino acids to the growing chain.
  + Each tRNA molecules has 3 unpaired bases, collectively called the anicodon
  + Ribosomes help form a peptide bond between the first and second amino acids- methionine and phenylalanine
  + Polypeptide chain continues to grow until the ribosome reaches a “stop” codon on the mRNA molecule
* tRNA and rRNA
  + mRNA- carriers the coded message that directs the process
  + tRNA- deliver exactly the right amino acid called for by each codon on the mRNA; they are adaptors that enable the ribosome to “read” the mRNA’s message accurately and to et the translation just right
  + ribosomes are composed of ~80 proteins and 3-4 different rRNA molecules
  + rRNA- help locate the beginning of the mRNA message

Initiation

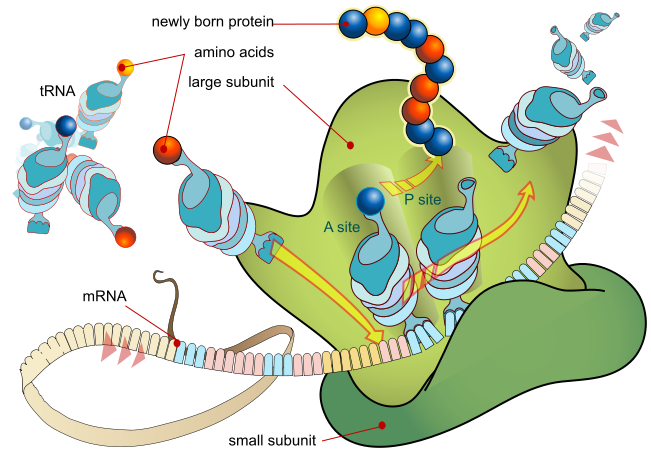
* The messanger RNA is transcribed in the nuclus and then enter the cytoplasm
* Begins at AUG, (The start codon)
* The ribosomes join the amino acids
* Gene Expression- the way in which DNA, RNA, and proteins are involved in putting genetic information into action in living cells
* All three major kinds come together

Elongation

* At the end of the initiation step, the mRNA is positioned so that the next codon can be translated during the elongation stage of protein synthesis.
* The initiator tRNA occupies the P site in the ribosome, and the A site is ready to receive an aminoacyl-tRNA.
* During chain elongation, each additional amino acid is added to the nascent polypeptide chain in a three-step microcycle.
* The steps in this microcycle are (1) positioning the correct aminoacyl-tRNA in the A site of the ribosome, (2) forming the peptide bond and (3) shifting the mRNA by one codon relative to the ribosome.
* The translation machinery works relatively slowly compared to the enzyme systems that catalyze DNA replication.

Termination

* Termination of the polypeptide happens when the A site of the ribosome faces a stop codon.
* A release factor binds to the ribosome and adds a water molecule to the end of the amino acid chain.
* The reaction hydrolyzes the polypeptide chain from the RNA, allowing the protein to exit the ribosome.

[](http://upload.wikimedia.org/wikipedia/commons/b/b1/Ribosome_mRNA_translation_en.svg)

Picture taken by LadyofHats

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